

## A Collaborative Program for the 2020 Great Solar Eclipse in Argentina

A. BASSETT<sup>\*1</sup>, S. RAMOS<sup>\*1</sup>, M. OLAVEGOGEOASCOECHEA<sup>\*1</sup>, M. RUCCI<sup>2</sup>, N. CAMINO<sup>3</sup>,  
S. PAOLANTONIO<sup>4</sup>, M. CORTI<sup>5</sup> and B. GARCIA<sup>6</sup>

**Abstract.** This contribution presents the preparation, actions and experience related with the Total Solar Eclipse on Dec 14<sup>th</sup>, 2020 in Argentina. The event in a pandemic year, was followed for millions of persons virtually, but inside the totality path and beyond, the citizens scientists and teachers were the protagonists.

### 1. Introduction

The program for the Total Solar Eclipse in Dec. 14th, 2020 in Argentina, mainly centralized in Neuquén province, were proposed and accepted at the end of 2019, with the following items as starting points of actions:

1. Provide tools and resources for the public before the astronomical event.
2. Assure educative and formative approaches to the subject in the case of teachers and professors at all educational levels.
3. Prepare high quality material for the public, as books, booklets, brochures, posters, but also as good website for reference and the use of social networks, mainly YouTube.
4. Contact the public before the eclipse, through open conferences, given by specialist in different topics connected with eclipses, light, Sun and space weather from the point of view of the natural sciences and with an historic perspective.

In this way, the challenge was to cover different aspect of education and outreach, assuring the cooperation between scientists, educators, politicians and general public in a cooperative job, in middle of a pandemics, in which the mobility would be reduced and the local people would be the real main actors in the activity.

### 2. The Earth

The path of the totality of the eclipse encompassed vast areas of oceans, but also crossed Chile and Argentina in the southern cone.

This path in our country involved a vast uninhabited territory, but it allowed us to reach towns that are not always the protagonists of these natural events allowing very diverse activities.

Although cities such as Junín de los Andes, Aluminé, Sierra Colorada, Valcheta and Las Grutas were adequate for the observation along the way, it was decided to concentrate the greatest efforts in a city whose average cloud cover was the lowest, according to the weather statistics: Piedra del Águila.

From that moment on, a series of coordinated activities were deployed in the territory.

### 3. The Activities

The activities planned for the event included:

- Creation of a website not only with information about the eclipse but also with unpublished material related to eye care and preparation for the observation before, during and after the eclipse.
- Preparation of brochures to be distributed throughout the country and available online.
- A series of 20 podcasts, prepared, scripted by the Team for the Eclipse, recorded on the radio of the Universidad del Comahue and distributed in all the country by Radio Nacional.
- A book by Paolantonio & Camino, [1].
- Detailed maps on the visibility of the total and partial eclipse, flyers and posters with details of the event, for both provinces of Neuquén and Río Negro.

### 4. The people and the virtuality

Although the preparation activities for the eclipse started in 2019, 2020 surprised us with an absolutely unthinkable situation, a global pandemic that forced us to develop virtual communication strategies with

---

\*1 Dept. of Physics, Universidad Nacional del Comahue  
abassett@gmail.com

2 Secretary of Tourism, Piedra del Águila, Neuquén

3 Universidad San Juan Bosco, Esquel, Chubut

4 Observatorio Astronómico de Córdoba

5 FCAG - National University of La Plata

6 ITeDA(CNEA-CONICET-UNSAM), UTN-Mendoza

people. Suddenly the internet and social networks became the most demanded resources. In this framework, several teacher training courses were proposed and among them the NASE [2] courses of the IAU were developed, of didactics of astronomy with an emphasis on topics related to the total eclipse. More than 60 teachers participated in this activity.

Virtuality took an unusual role in the face of quarantine. We decided, beyond the saturation of virtual meetings, to develop the cycle of conferences "Encounters at sunset", to address different aspects of the Sun and eclipses. The participation of professional astronomers from Argentina, Colombia, Chile, Mexico and Uruguay was counted. From the training courses and conferences given, the teachers prepared new materials for their students (Fig. 1).



Fig. 1. The amazing Total Solar Eclipse, credit INFOBAE.

#### 4.1. The logistics

Another aspect to highlight was the logistics of distribution of 100,000 solar glasses, donated by Astronomers Without Borders, 200 tactile books ("*Abre tus sentidos a los eclipses: Sudamérica*") prepared by the University of Edinburgh (USA) and made by NASA and 10 LightSound devices [3], the instrument to transform light into sound from Harvard University. The distribution was carried out from schools, hospitals, asylums for the elderly, city squares, reaching distant places in the middle of a pandemic, with the care recommended by International Organizations and local Ministries of Health.

Around 40,000 pairs of sunglasses were distributed in the totality area (see Fig.2) and more than 40,000 in the rest of the country.

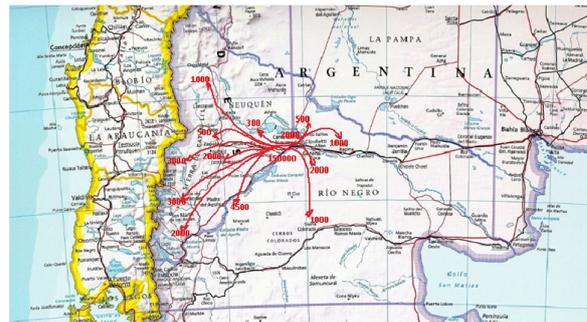


Fig. 2. Thousands of pair glasses were distributed along cities in provinces of Río Negro and Neuquén.

In this way we arrived at the day of the eclipse, with thousands of visitors in the localities where the eclipse was total, since by that days it was allowed to move along the country with permissions and care; and perhaps millions of people connected to the internet from all over the planet.

#### 5. Conclusions

People of different ages and experiences were part of one of the most impressive natural phenomena, sharing their personal experience through social media. Also transforming themselves into Citizen Scientists, by being interviewed by the press media that widely covered the event in all the cities of the totality and beyond. Using eclipse images to communicate the event "a *moment of happiness*" in the middle of the sadness of the pandemia, and recording the most used words on Dec. 14<sup>th</sup>, during the total solar eclipse: "incredible", "spectacular", "unique".

Finally, we want to thanks everyone who made this experience possible, sharing knowledge as part of communicating Astronomy with the public and enjoying this special event.

This work was partially funded by the European Union's Horizon 2020 research and innovation program under grant agreement No 872859-REINFORCE.

#### References

- [1] Paolantonio S. & Camino, N. 2020, "Eclipse Total de Sol 2020: Documento Didáctico", <https://eclipse2020.uncoma.edu.ar/>
- [2] Ros, R.M. et al., "Network for Astronomy School Education", 2021, [www.naseprogram.org](http://www.naseprogram.org)
- [3] Byerila et al., 2020, CAP 2021. In press, (<http://astrolab.fas.harvard.edu/LightSound-IAU100.html>)

Oral presentation	Jacinta Delhaize	Daniel Cunnama	The Cosmic Savannah: Bringing African astronomy to the forefront	The Cosmic Savannah is an exciting new podcast highlighting the internationally-renowned astronomy and astrophysics coming out of the African continent. Africa has long been an underdog in the world of astronomy, but it is now emerging as a world-leader. Africa has an all-too-rare commodity; vast areas of pristinely dark skies and radio-quiet zones. This is why South Africa hosts the largest optical telescope in the Southern Hemisphere (SALT) and one of the world's most powerful radio telescopes (MeerKAT). Soon, it will also host a large part of the mighty Square Kilometre Array. Not only will these telescopes revolutionise our understanding of the Universe, but they can also be leveraged to significantly improve society. This can only come about, however, if the existence of these telescopes and their discoveries is effectively communicated with a wide-spread public. The Cosmic Savannah was created to help facilitate this communication. Released once a fortnight, the episodes introduce the public to the telescopes, instrumentation, researchers, discoveries and public engagement efforts coming out of the African continent. In particular, we regularly feature a diverse range of young African astronomers who can serve as role models for the next generation. We will demonstrate how we are fighting the somewhat pessimistic impression of Africa as the "dark continent" by demonstrating that this can be leveraged into something that all the people of Africa, and the world, can be intensely proud of. We will also describe how we use our platform to foster an appreciation for the scientific method, critical thinking, general scientific literacy and environmental conservation.
Oral presentation	Beatriz García	Ana Basset, Néstor Camino, Mariela Corti, Mara Olavegogeoasca, Santiago Paolantonio, Susana Ramos, Martín Rucci	A collaborative program for the 2020 great Total Solar Eclipse in Argentina	The great eclipse of December 14th, 2020 was an opportunity to have evidences about the effectiveness of the work performed along several years in education and outreach of Astronomy in Argentina. In this sense a cooperative work was performed in order to face a spectacular event in the middle of probable one of the worst years for an activity as the astronomy for the public, where the activities imply a close contact between the public and the scientists. This contribution shows several different but coordinated actions to assure the success of the activities connected with the eclipse, which also included the online transmission of the event for a world in quarantine. Hundred of virtual meetings and broadcasts transmissions from all the planet, training teachers and training citizens workshops, conferences, production of special materials, brochures, contests were proposed, and distribution of material to observe the eclipse, such as certified glasses or pinhole cameras, and inclusive tools such as tactile materials and LightSound detectors, were distributed to more than a hundred thousand people along the totality path and beyond. In this contribution, we present the successes connected with this special program for the eclipse, but also the failures, which teach us what to improve for the next event, probably the December 4th 2021 eclipse in Antarctica, a new and real challenge for the Argentinian communicators of science.
Oral presentation	Callum Griffiths	Pedro Russo	Astronomy and Space Science Communication by Space Industry	At the Astronomy & Society Group of Leiden University we are interested in bridging the gap between experts and the general public. The team largely focuses on astronomy related issues, but are more than willing to branch out into other scientific disciplines, particularly where there is overlap with astronomy. The situation with the space industry is curious, in that astronomy and space science are very independent fields and yet in the minds of the public they are inextricably linked. From a communication standpoint, it seems appropriate to lean into this public perception and encourage collaboration between astronomy and space science institutions for the benefit of both fields and their agendas, as well as the public who are interested in the achievements of each. The state of the space industry in the Netherlands is reflective of the rapidly-growing global picture. Increasing digitization, along with the floods of data flowing out of the Internet of Things, presents great opportunities for space companies to take advantage of falling prices and miniaturization in satellite technology. This allows small companies to overcome barriers and make entry into space-related markets. The availability of Earth Observation data has seen a generation of data service providers prosper. The Dutch space cluster is made up largely of high-tech Small- & Medium Enterprises (SMEs) either in data services or as part of the international production line for intergovernmental agency projects, such as launchers and satellites. However, despite the growth of this emerging market and the significant government funding they have access to, little is known about the public engagement practices of these companies. For this research we are conducting interviews with dozens of the CEOs and Managing Directors of the 70+ space companies currently operating in the Netherlands. These interviews uncover the nature and frequency of public engagement activities that these companies involve themselves with. They also expose their motivations for communicating their science, as well as the barriers that prevent them from doing more. In this oral presentation we will unpack the results of this study, and map out the public engagement landscape of this industry. With this knowledge we can begin to signpost a route for astronomy communicators to collaborate with the space industry. At the end of this presentation we will attempt to rouse the years of astronomy communication expertise in the audience to discuss ideas on how the community could turn astronomy communication successes towards the space industry.
Oral presentation	Eva-Maria Ahrer	Melanie Archipley, Hannah Dalglish, Daniel Mortimer	Redefining astronomy summer camps in the age of the pandemic: a break from the IAYC's 50-year history	The International Astronomical Youth Camp (IAYC) is a three week long summer camp, where around 65 participants aged 16-24 work on independent research led astronomy based projects. The IAYC is organised by the International Workshop for Astronomy (IWA) and its missions are to spread astronomical knowledge and to teach young people to work independently on scientific projects, while promoting international collaboration. Unfortunately, due to the ongoing COVID-19 pandemic, the 2020 and 2021 installments of the IAYC had to be cancelled, a first in the camp's history. A new online format had to be established dubbed the eIAYC. A group of IWA members, the leader team of the eIAYC, decided on three types of activities to occur throughout the summer months as part of the eIAYC: (1) an engagement series which included a combination of astronomical talks and workshops every few weekends; (2) small independent projects, where a subsection of the leader team provided short projects for the participants to work on over a few weeks and give them an opportunity to present their work in the form of short reports or electronic posters; (3) a non-astronomical program (NAP), where the participants take part in social activities to encourage international communication and cultural exchange. The eIAYC 2020 ran from the 16th of June until the 30th of August with a total of 63 participants. Everyday communication throughout the eIAYC was done using a Discord server, while weekly updates and schedules were also sent via email. In this talk we present our experience of taking the format of a three week long in person summer camp and developing an online alternative to stay in touch with our wide community and keep up our outreach activities during the ongoing COVID-19 pandemic. Moreover we want to highlight organisational challenges and our experiences when it comes to online engagement, in particular given that the participants come from a wide range of academic and cultural backgrounds. We will also talk about the lessons learned and how they informed our plans for this year's eIAYC. Finally we would like to speak about the impact of COVID-19 on IWA, a non-profit organisation, both on its organisational structure as well as on its financial situation, and how it will affect the way we operate in the future.